Constant Voltage and Constant Current DC Power Supply Instruction

Model: RD6006/RD6006-W

Date: 2020.3.11

Dear users, thank you for purchasing the constant voltage constant current DC power supply produced by Hangzhou Ruideng Technology Co., Ltd. In order to let you know more about the full function of this product, get a better experience and avoid misuse. Please read this instruction carefully before using it. Keep it for future reference.

Note: This instruction is corresponding to firmware V1.25, the page and operation may be different under different firmware versions, please pay attention when using it. We do recommend you to download the latest firmware for better experience.



CONTENT

Production introduction

1.1 Technical Parameter

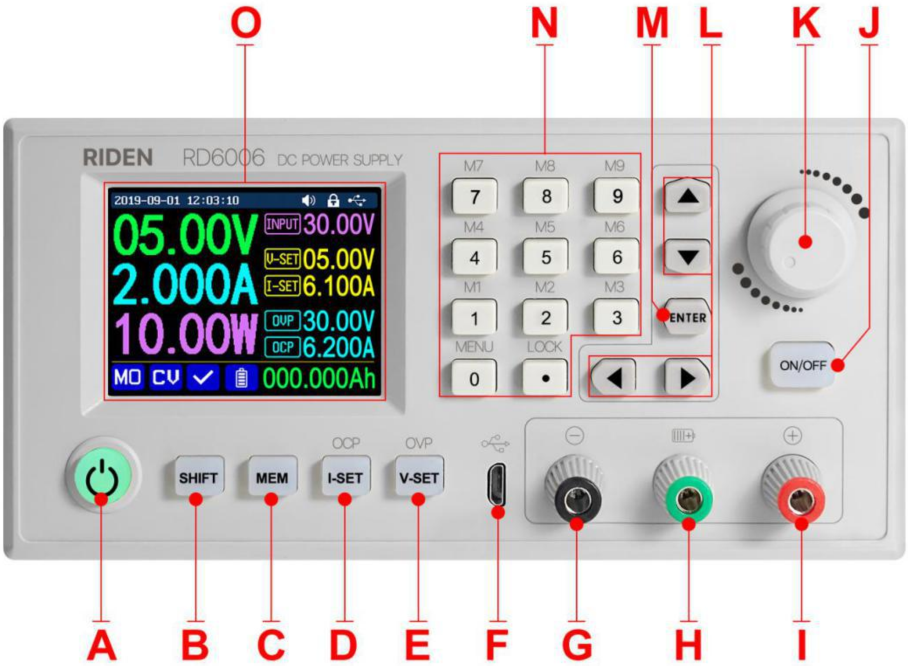
Model:RD6006	Display Screen:2.4 inch color LCD display
Input voltage range: 6-70.00V	Input voltage measurement resolution: 0.01V
Output voltage range: 0-60.00V	Output voltage measurement resolution: 0.01V
Output current range: 0-6.000A	Current setting measurement resolution: 0.001A
Output power range: 0-360.0W	Battery voltage measurement resolution: 0.01V
Output voltage accuracy: ±(0.3%+3 digits)	Output current accuracy: ±(0.5%+5 digits)
Input voltage accuracy: ±(1%+5 digits)	Battery voltage measurement accuracy: ±(0.5%+3 digits)
Output ripple typical: 100mV VPP	Working temperature range:-10℃~40℃
Constant voltage mode response time: 2ms（0.1A-5A load）	External sensor Temperature detection range: -10℃~100℃/0℉~200℉
Constant voltage mode load regulation : ±(0.1%+2 digits)	External sensor Temperature detection accuracy: ± 3℃/ ± 6℉
Constant current mode load regulation: ±(0.1%+3 digits)	Capacity measurement range: 0-9999.99Ah
Screen brightness setting: 0-5 level total 6 levels	Energy measurement range: 0-9999.99Wh
Weight(with package): 607g	Capacity and energy statistical error: ±2％
Product dimension: 167*81*65mm	Working mode: Buck mode Voltage drop >1V and >10%

1.2 Core Function

·keypad + encoder potentiometer combination adjustment
·2.4 inch HD color screen
·Battery charging special interface
·Data quick storage & recall
·New PC software
·Wi-Fi connection, Phone APP control

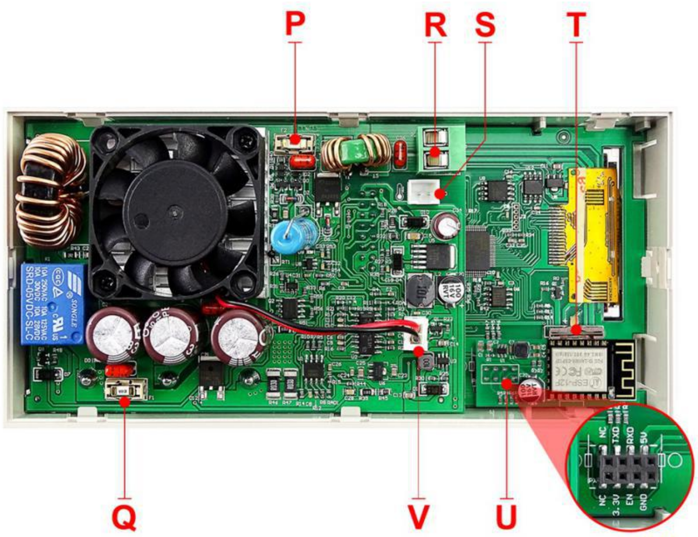
1.3 Panel Description

1.3.1 Front panel



A: Power button	B: Second function button
C: Quick storage button	D: Current/Over current protection value setting
E: Voltage/Over voltage protection value setting	F: Micro USB interface
G: Power supply output negative electrode Battery charging negative electrode	H: Battery charging positive electrode
I: Power supply output positive electrode	J: Output switch
K: encoder potentiometer/Cancel button	L: Direction button
M: Confirm button	N: keypad
O: Screen	

1.3.2 Back panel



P: Input fuse	Q: Output fuse
R: Power source input interface	S: External temperature sensor interface
T: CR1220 battery socket	U: Communication module interface
V: Fan interface	

NOTE:

Power source input interface must be connected to 6-70V constant DC power source. The external sensor cable (as shown on right) must be connected to the external temperature sensor interface. The fan interface cannot be connected to other fans. When the output current is higher than 4A or the system temperature higher than 45℃, the fan start to work, when the temperature is less than 40℃ and output current lower than 3.9A, the fan will stop working. When the system temperature is higher than 80℃, the output will be shut down because of OTP. CR1220 is the clock battery(Please prepare by yourself), communication interface is a special interface, please don't connect to other modules or cables.



You can see the Wi-Fi module(RD6006-W contains) and RS-485 module in the picture below. If you need RS-485 for industrial batch test and it is not on sale now, if you want to use that, please contact us.

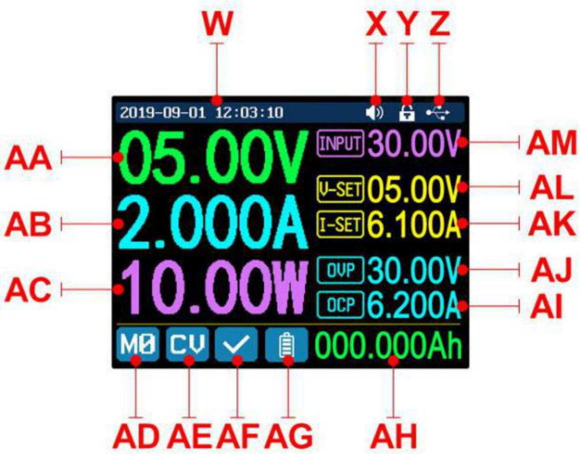




1.4 Operation Introduction

After power-on, the boot image is displayed first, then enter the main page.

1.4.1 Main Page



W: Time	AF: Protection status indication
X: Button tune	AG: Battery charging indication
Y: Button lock status	AH: Battery related information display area
Z: Communication interface	AM: Input voltage
AA: Actual output voltage	AL: Output voltage preset value
AB: Actual output current	AK: Output current preset value
AC: Output power	AJ: Over voltage protection value
AD: Current data group	AI: Over current protection value
AE: Constant voltage Constant current status	

1.4.2 Operation Introduction

In the menu operation, the icon in red or cursor is the currently selected menu, the icon in blue is the unselected menu, press **ENTER** to confirm, press the encoder potentiometer to cancel or return, press the direction key to move the cursor or switch menu, rotate the encoder potentiometer to change the setting, the settings will be automatically saved when returning from the menu page. Press and hold the 0 button and power on to restore the factory settings, press and hold the 1 button and power on to restore the factory calibration value, press and hold ENTER and power on to enter the boot mode.

1.4.2.1 Battery Charging Function Introduction

Battery charging operation video：https://youtu.be/irTbqfqtgU0

After power-on, at battery related information display area, external temperature, capacity and energy will loop display. When there is output current: capacity, energy automatically Accumulated, and automatically cleared after shutdown.

The green terminal is connected to the positive pole of the battery, and the black terminal is connected to the negative pole of the battery. After the battery is correctly connected, the battery charging indicator turns red and the battery is connected. Press ON/OFF to start charging, the battery charging indicator turns green. When the actual output current is lower than 10mA, the output will be shut down automatically. Battery with protection board may not be charged. The charging voltage and current should be set on your own.

It is strongly recommended to use the original charger to charge the battery. There is a risk of fire and explosion during the charging process. Non-professionals should not operate.(*COMMON BATTERY VOLTAGE can be check in Appendix 1.*)

1.4.2.2 Main Page Output Voltage and Output Current Setting

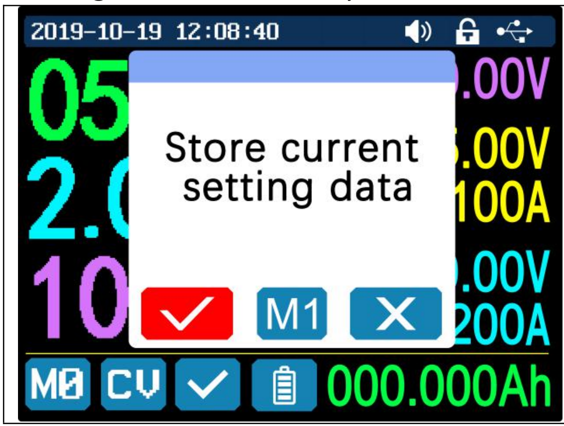
Output voltage and current setting operation video：https://youtu.be/S6Kan66dNsk

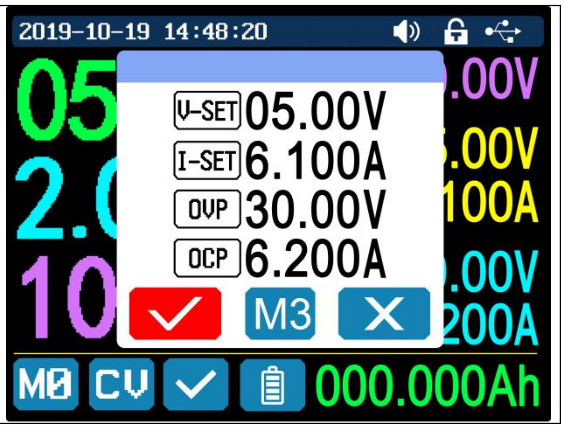
Press “**I-SET”** button to set the output current value, you can use encoder potentiometer to adjust the output value directly, press the direction button to move the cursor. Of course you can use keypad to set the value, and press “**ENTER**” to confirm. If you set the wrong value, you can press encoder potentiometer to cancel.

Press “**V-SET”** button to set the output voltage value, the operation method is similar to output current setting.

Press **“SHIFT”**+ “**I-SET”** button or **“SHIFT”**+ “**V-SET”** button to set the over current protection/ over voltage protection value. The operation method is similar to output current setting.

M0 is the default data group when RD6006 is powered on, manually modify the settings and automatically remember to M0 after confirmation.





1.4.2.3 Data Group Quick Storage and Call out

Data group quick store and call out operation video：https://youtu.be/eo5saPjOGpo

Press **“MEM”**+keypad button 1-9, you can store the output voltage value, output current value, over voltage protection value, over current protection value into the corresponding data group(as shown above), then press **“ENTER”** to confirm, or press the encoder potentiometer to cancel.

Press **“SHIFT”**+keypad button 1-9 to quick call out the saved data(as shown above). Press **“ENTER”** to confirm, or press the encoder potentiometer to cancel.

1.4.2.4 Keypad lock and unlock

Keypad lock operation video：https://youtu.be/zxpmasJyQ6Y

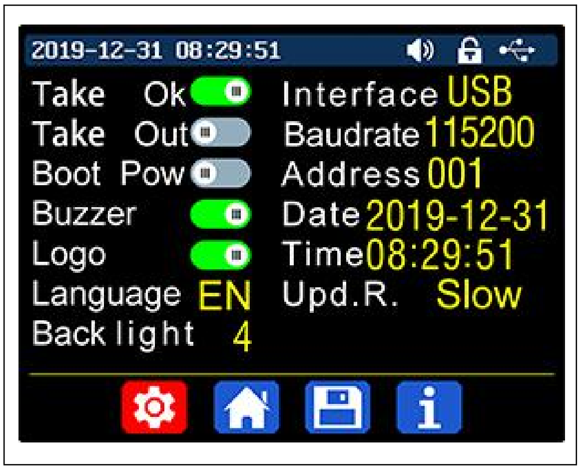
Press **“SHIFT”+”LOCK”** to lock or unlock the keyboard. And the keypad will be automatically locked when communication starts, there will be displayed on the top(can not unlock manually), and the keypad will be automatically unlocked when the connection disconnected manually, there will be displayed, the keypad will

be automatically unlocked when the connection disconnected abnormally, and the power off button can be used when the keypad is locked.

1.4.2.5 System Setting

System setting operation video： https://youtu.be/Q9d3rIgIrOc

Press **“SHIFT”+”MENU”** to enter the system setting menu as shown on the right, press



“ENTER” to enter the menu, press direction button to select option, the option in red is the option be chosen, rotate the encoder potentiometer to change setting.

Turn on the “**Take OK**”, a confirmation window will pop up when you quick call out a data group. If you turn it off, the setting values will be modified directly when you call out a data group.

Turn on the **“Take out”**, the output will be turn on automatically when you call out a data group. If you turn it off, the output will keep the previous status.

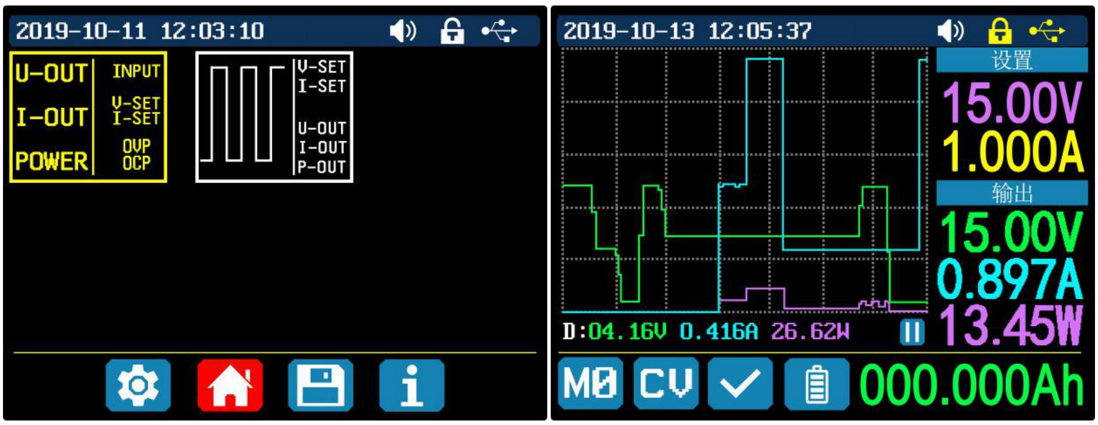
Turn on the **“Boot Pow”,** it will turn on the output automatically when start. If you turn it off, the output will keep OFF status when started.

Turn on the **“Buzzer”,** you will hear button tune when press the button, and there will be  on the top. If you turn it off, there will not be button tune when press the button, and there will be  on the top.

Turn on the **“Logo”**, it will display Logo first and then enter the main page when boot RD6006. If you turn it off, you will enter the main page directly.

The system language supports Simplified Chinese and English for the time being; the screen brightness can be set from level 0 to level 5; The communication interface can be set to USB, Wi-Fi or TTL, **USB** interface is the Micro-USB interface on the front panel interface, you can see the on the top when communication starts. **Wi-Fi**

interface is the Wi-Fi module connected to the communication interface, you can see the on the top when communication starts (connect mobile phone by Wi-Fi, but you need to choose Wi-Fi interface first, Wi-Fi module can not be installed or removed when RD6006 is powered on), **TTL** is not available for the time being; When the interface is changed, you need to reboot RD6006 to apply the modification. The baud rate can be set 9600/19200/38400/57600/115200 under USB mode; The Baud rate under Wi-Fi is fixed at 115200. Device address can be set from 001-255. You can set the date and time by rotating the encoder potentiometer, the setting will be saved immediately after modification. Please do not set a wrong time, it may cause the date to not be automatically accumulated. Press the encoder potentiometer to return, and the set value will be saved automatically. **Upd.R.** is the refresh rate of read back voltage and current in the main page, you can set it to low, middle and high. Press encoder potentiometer to return and it will be automatically saved.



1.4.2.6 Main Page Style Setting

Main interface display style setting operation video：https://youtu.be/f51VDiY2VHE

You can press SHIFT + MENU to enter the system setting menu, and then press the right button to enter the main page style setting menu as shown above. Press ENTER and then use direction button to set classic style or curve style. The pattern in red is the style be chosen. The classic style is the system default style, and the large font shows the voltage, current and power. The curve style is as shown above, the color of the three curves corresponds to the output voltage, current and power. D is the scale of the ordinate, Press **"ENTER"** to start or pause the curve, and rotate the encoder potentiometer to scale the ordinate of the curve.

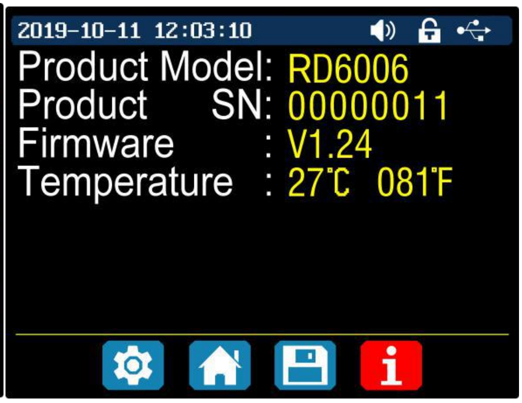
1.4.2.7 Storage Data Setting

Data group setting in manual operation video：https://youtu.be/i1kTeurS13I

You can press SHIFT + MENU to enter the system setting menu, and then press the right button twice to enter the data storage setting menu as shown below, press ENTER to enter the setting menu, the icon in red is the chosen data group, press the direction button to select data group number. Press “**I-SET”** button to set the storage output current value, then rotate the encoder potentiometer the adjust the output value, press the direction button to move the cursor. You can also set the value with keypad, press ENTER to confirm. If you set the wrong value, you can press the encoder potentiometer to cancel. Press “**V-SET”** button to set the storage output voltage value, the operation method is similar to storage output current setting.

Press **“SHIFT”**+ “**I-SET”** button or **“SHIFT”**+ “**V-SET”** button to set the storage over current protection/ storage over voltage protection value. The operation method is similar to storage output current value setting. Press encoder potentiometer to return, and the data will be automatically saved.





1.4.2.8 System Information

System information operation video：https://youtu.be/Um4NQObeeJE

You can press SHIFT + MENU to enter the system setting menu, and then press the right button three times to enter the system information menu as shown above. You can view the SN number, firmware version and system temperature here.

IOS APP Instruction

2.1 Mobile Phone APP installation

2.1.1 APP Download

IOS APP can only supports IOS8.0 system or above, please search “RDPower” to download, or search “RD6006” to find the APP.The software opened under IOS13 will apply for location service for the first time. Please agree and open the location in Settings-Privacy. Don’t install or remove Wi-Fi module when the power is on, or else it will be damaged. This instruction is made for version 1.0.1, there will be little difference between different versions, we do recommend you to download the latest App for better experience.

2.1.2 APP Installation and Operation

IOS APP download and connection operation video ：
https://youtu.be/nH2HYwop0TE

The first time you start the APP, there will be prompt as shown in Picture 2 if your mobile phone system is IOS13 or above, choose “Allow when using APP”, if your system is under IOS13, you can see the prompt as shown in Picture 3, please choose ”Wireless LAN and cellular mobile network”.

2.2 Software Update

When there is a big update, you will see a update prompt when you start the APP, or you can download the latest the software at APP store, this instruction is corresponding to IOS APP version 1.0.0 .

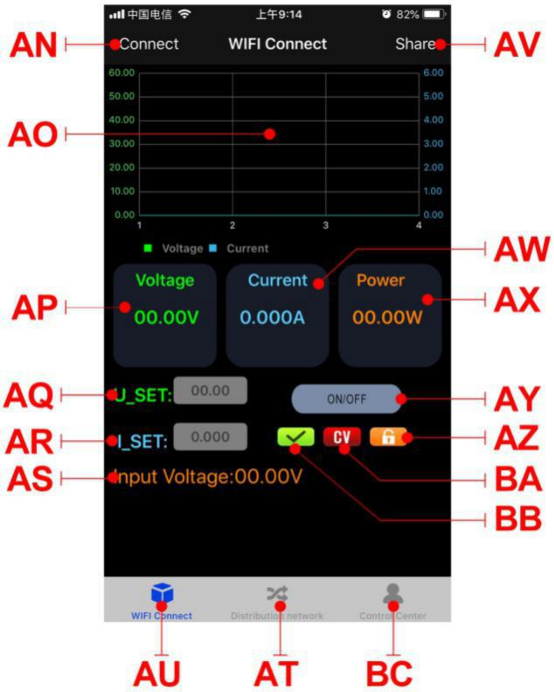
2.3 APP Interface Display

When you start the APP you can see the interface as shown in picture 1

AN：connection button	AV：share button
AO：output voltage and current curve	AW：actual output current value
AP：actual output voltage value	AX：actual output power value
AQ：output voltage preset value	AY：ON/OFF button
AR：output current preset value	AZ：keypad lock indication
AS：input voltage	BA：constant voltage/constant current status
AT：network distribution page	BB：abnormal status
AU：main page	BC：personal center

2.4 APP Operation

2.4.1 Network Distribution



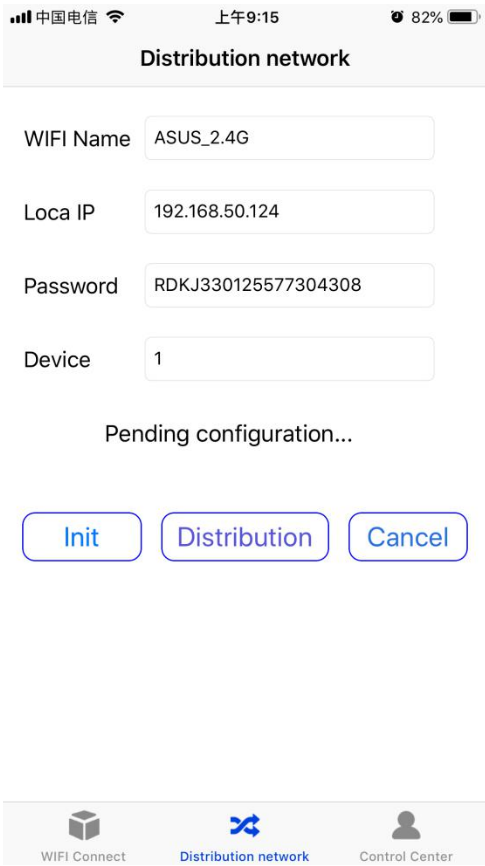
Picture 1



Picture 2



Picture 3



Picture 4



Picture 5



Picture 6

Connect Wi-Fi for the first time, you need to insert the WiFi board first, then power on the RD6006, Set the communication interface to WIFI, restart, the RD6006 and the mobile phone should be placed close to the 2.4G router (the mobile phone must also be under the same 2.4G network, and the router must disable the AP isolation function). RD6006 will wait for the phone to connect as shown in Picture 5. Presses **"AT"** to the **"Network Distribution"** page, you need to enter the WiFi password here. Click **"Init"** . After waiting for a while, the RD6006 will obtain the IP address of the mobile phone as shown in Picture 6. Then click "**Distribution**", wait for a while there will be a prompt shows connection succeeds, and RD6006 will start normally, the network distribution is successful, return to the main interface and click **"AN"**(Connect). If the distribution network fails, please power off the module and re-operate in the same way (multiple networking failures you can try to replace the router or use the hotspot of the mobile phone to test, and you can watch the video to check the connection step).

2.4.2 Network Distribution

IOS APP operation video :https://youtu.be/lXSw1CM9IY8

When RD6006 starts normally, it will connect WiFi first, and then it will detect if it can communicate with APP, and they cannot communicate when the mobile phone is under lock screen status. If the IP address of your phone changes, you need to press the **left direction button** and **ENTER** button to reset the network distribution, and repeat operation in section 2.4.1 .

2.4.3 APP function

Press **AQ** or **AR** text area, you can enter the voltage/current set value, and click the blank area to return, and you cannot enter a value exceeds the limit, click **AV** to export the voltage and current curve as Excel file to other APP, it can record data for 24 hours max.

Click the personal center to set the language or get help.

Android APP Instruction

3.1 Mobile Phone APP installation

Note: This product mobile APP function only supports Android 5.0 system or above. During the APP installation process, it will apply for location service. Please agree and turn on the location service. After downloading the mobile APP zip-file, please install the APP in file manager.

Don't install or remove Wi-Fi module when the power is on, or else it will be damaged.This instruction is made for version 1.0.3, there will be little difference between different versions, we do recommend you to download the latest App for better experience.

3.1.1 APP download:

You can download the RD6006 APP zip-file in this URL:
https://drive.google.com/open?id=17V-JWHvqMF-NuWSznEiJ4RKrnn_Pkt5v
You can also search "RdPower" in Google Play or click the link below to download the android APP:
https://play.google.com/store/apps/details?id=com.rdseriergoogle.socketassistant
Android APP download and connection operation video ：
https://youtu.be/QwyBEUCnp9c

3.2 Installation Introduction

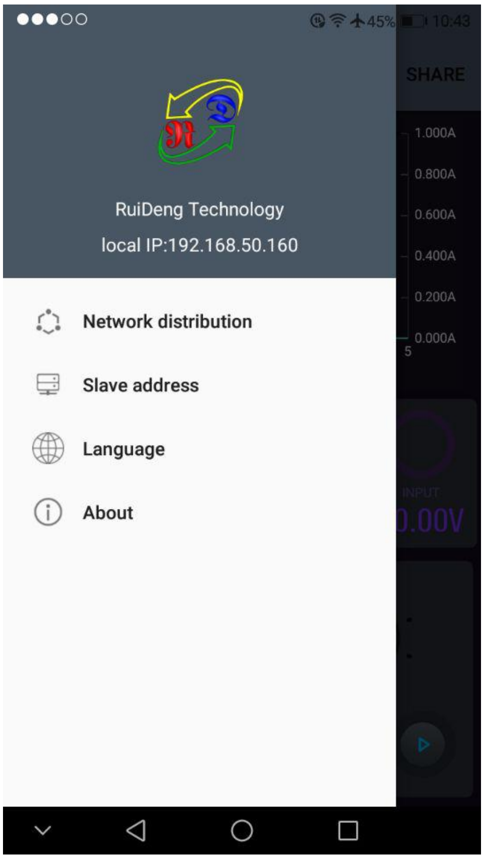
After the installation, you can see the icon as shown below:

3.2.1 APP Start-up

Click the APP icon, After the APP starts, it will automatically detect whether there is a updated version, and it will remind you by popping the window.

3.2.2 APP Interface Display

When updated to the latest version, the main interface of APP as shown below in Picture 1:

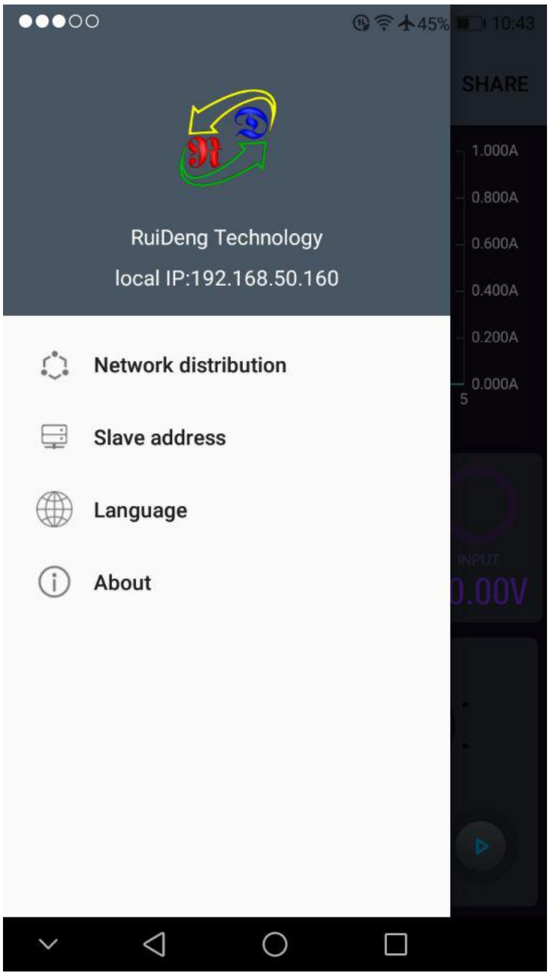
	
Picture 1	Picture 2

BD: call out/ shut down sidebar
BE: connection button
BF: export data to mobile phone folder (Mobile phone memory or SD card root directory, repeated writing, can directly generate graphs in Excel), and can share files to other APP.

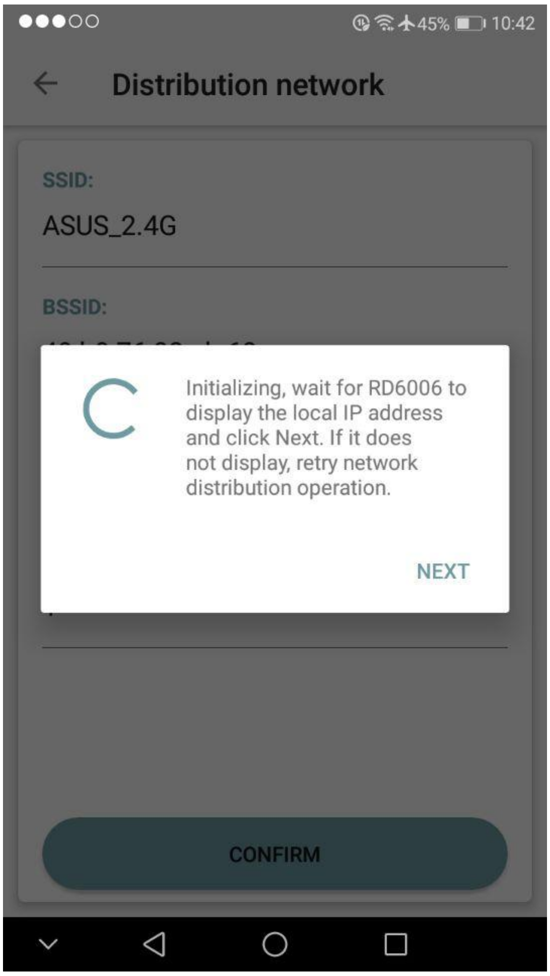
BG: voltage and current curve	BH: actual output voltage
BI: actual output current	BJ: output power
BK: input voltage	BL: preset voltage value
BM: preset current value	BN: ON/OFF switch
BO: keypad lock indication	BP: protection status indication
BQ: constant voltage/ constant current status	BR: move the cursor to the left
BS: settings	BT: move the cursor to the right
BU: setting wheel	

3.2.3 APP Connection and Operation

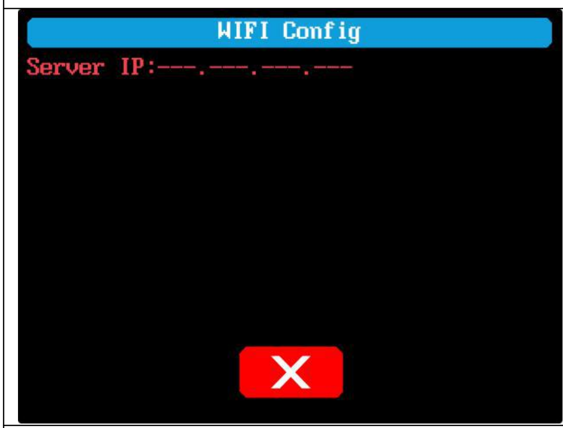
3.2.3.1 Network Distribution



Picture 3



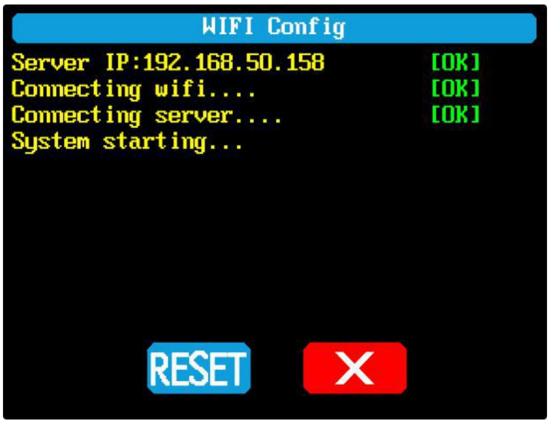
Picture 4



Picture 5



Picture 6

	
Picture 7	Picture 8

Connect Wi-Fi for the first time, the RD6006 and the mobile phone are placed close to the 2.4G router (the mobile phone must also be under the same 2.4G network, and the router must disable the AP isolation function).

Set the communication interface to WIFI, restart, RD6006 will wait for the phone to connect as shown in Picture 5. Presses **"BD"** to call out the sidebar, clicks on the **"Network distribution"** as shown in Picture 3. There will be "Initializing..." displayed on the screen as shown in Picture 4.

After waiting for a while, the RD6006 will obtain the IP address of the mobile phone as shown in Picture 6. Then click "Next", fill in the WIFI password as shown in Picture 7, click "CONFIRM" below, wait for a while RD6006 will automatically restart, the distribution network is successful, return to the main interface and click **"BE"**(Connection). If the distribution network fails, please power off the module and re-operate in the same way (multiple networking failures you can try to replace the router or use the hotspot of the mobile phone to test).

3.2.3.2 Proper Wi-Fi Connection

Android APP download and connection operation video ：

https://youtu.be/QwyBEUCnp9c

When power on RD6006, it will connect Wi-Fi first, and then detect if it can be connected to APP as shown in Picture 8(the APP must already be running). If the IP address of the phone has changed, you need to press the "left direction" button and then press "ENTER" button to reset the net, repeat 2.2.3.1 operation.

3.2.3.3 APP Functions

Android APP operation video :

https://youtu.be/hqrF4keTfbE

Click **"BL"** to set the output voltage, and use the wheel **"BU"** to adjust the value, the **"BR"**, **"BT"** to change the position of cursor, click **"BS"** to set the parameter. Click **"BF"** to exports the voltage-current curve to excel file, up to 24 hours document can be recorded.

NOTE:

1. There are many kinds of Android phone, so the user interface maybe different on some brand phones or different scales of the same brand.
2. Application permission requirements, allow the necessary permissions when the APP is installed (allow background running, using Bluetooth, operation on the folder, reading the application list, etc.) and also set the permissions of the APP after installation: Allow background running, never shut down when lock screen, allow self-starting(it is used to prevent the system from forcibly exiting the APP when recording data), etc.

PC Software Installation and Operation Instruction

Requirement: the PC system must be Win 7 or above, and the computer has Internet connection.

This PC software is designed by Hangzhou Ruideng technology CO., LTD, it has no virus, if your anti-virus software prompts for a virus warning, please allow all its features, otherwise it will affect the normal operation of the software.This instruction is made for version 1.0.0.3, there will be little difference between different versions, we do recommend you to download the latest App for better experience.

RD6006 digital power supply file download link:

https://drive.google.com/open?id=17V-JWHvqMF-NuWSznEiJ4RKrnn_Pkt5v

Alternate link:

http://www.mediafire.com/folder/ssjf3s35ev68v/RD6006

4.1 Software Download

PC software download and basic video:

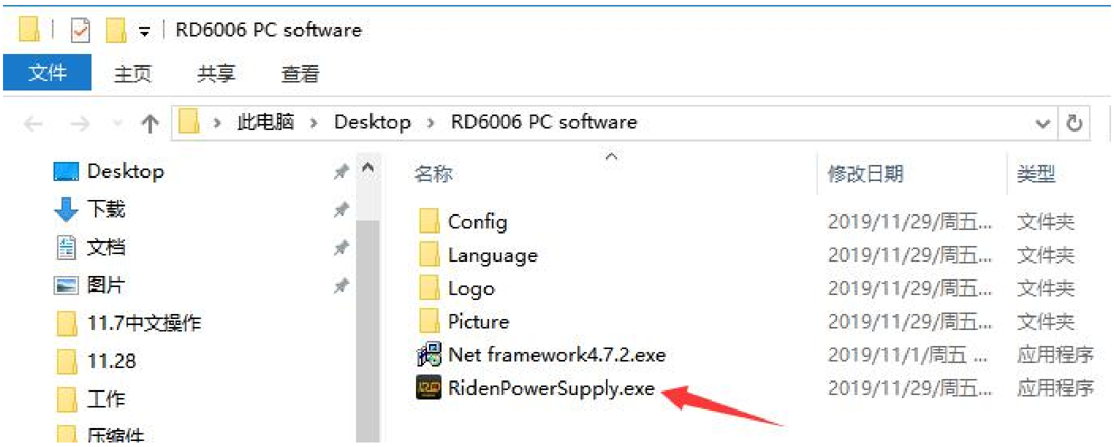
https://youtu.be/mjt1RMaah1Y

4.1.1 Unzip Files

Unzip files and RD6006 PC software doesn't need to install.

4.1.2 Software Installation

Double click RidenPowerSupply.exe to start RD6006 PC software. If you haven't install the .Net before, you need to double click Net Framework4.7.2.exe to install it first. Do not delete any files.



4.2 Software Operation

4.2.1 Connection



Double click **Riden Power Supply** on the desktop to enter the PC software.

USB connection: Set RD6006 communication interface to USB and connect RD6006 and PC, the PC software prompts the serial port has been updated and clicks online.

WiFi connection is a test function, due to poor compatibility of some computers, if you cannot connect PC software via WiFi, please ignore this function. For this function, we do not provide any guarantee and technical support, and we will decide whether to keep this function based on customer feedback.

WiFi connection video link:https://youtu.be/ussQREniPuY

Click WiFi on the PC software and enter the WiFi name and password, set the communication interface to WIFI and reboot, you can see the display of RD6006 as shown in picture 1, and click "**configure IP**" to distribute network, wait RD6006 display as shown in picture 2(wait 1-5 seconds), click "NEXT", wait for a while(about 20 seconds), the PC software shows connection successful, then click "**Connect**" to communicate.



Picture 1



Picture 2

4.2.2 PC Software Operation Instruction

Choose the right communication port, baud rate, slave address(default 001), click **"CONNECT"** to start communication. If the communication succeeds, the power supply button will be locked automatically, the buttons will automatically unlock after 3 seconds of accidental disconnection, and the **"CONNECT"** turns to **"DISCONNECT"**; Click **"ON"** to turn on the output of the power supply, and it will turn to **"OFF"**.



4.3 Functions Introduction

The PC software interface mainly has basic functions, firmware upgrade, Logo upgrade, version update detection and language setting...



BU: Voltage-Current Curve
BV: Battery information/Data Group Quick Call Out
BW: Calibration
BX: Input Voltage
BY: Actual Output Voltage
BZ: Actual Output Current
CA: Actual Output Power

CB: System Temperature(℃)
CC: System Temperature(℉)
CD: Constant Voltage/ Constant Current Status
CE: Protection Status Indication
CF: Screen Brightness Setting
CG: Synchronize System Time
CH: Output Current Preset value
CI: Output Voltage Preset value
CJ: Firmware Version
CK: Serial Number
CL: Product Model

4.3.1 Basic Functions

PC software operation video: https://youtu.be/mjt1RMaah1Y

The basic functions of PC software: voltage/current preset, data group quick call out, calibration fine tuning, brightness setting, voltage and current curve exporting. You can rotate the wheel or type numbers to set the voltage and current, the graph above the button shows the real-time voltage and current curve.



4.3.2 Firmware Upgrade

Firmware update operation video: https://youtu.be/NOoLfDw0DiY

Press and hold “**ENTER**” and power on RD6006, enter the boot mode, then connect it to computer, there will be “boot mode” in the mode information text box, then click **“FirmUp”**, a firmware upgrade prompt will pop up on the interface, and click “Upgrade Now” to upgrade. (You can upgrade the firmware under the APP mode, if it can not be started up normally, you should press and hold the **“ENTER”** button and power on, upgrade it under boot mode.)



During the firmware upgrade process, the interface is displayed as follows:



4.3.3 Calibration

The calibration fine-tuning function needs to be operated by a professional electronic person who has more than five and a half multimeters. It will change the system setting, incorrect operation may exceed the hardware limit and cause damage, and the resulting damage is not covered by the warranty! The limit error of the product is generally much smaller than the nominal error, when the error is close to or even higher than the nominal error, you need to check if the measuring instrument is accurate.

RD6006 calibration operation video: https://youtu.be/c9sn1wY2mjE

Click **"Calibration"** and enter the password "168168", you can enter the

Calibration Fine Tuning page(if you enter the password, By default you have accepted the above red letter agreement). It can read the calibration data after connection, click the arrow to fine tuning the data. According to the linear function y=kx+b, the constant b is equivalent to the zero value, the slope k is equivalent to the proportional value, adjust this two values so that the the data will be close to the real value.

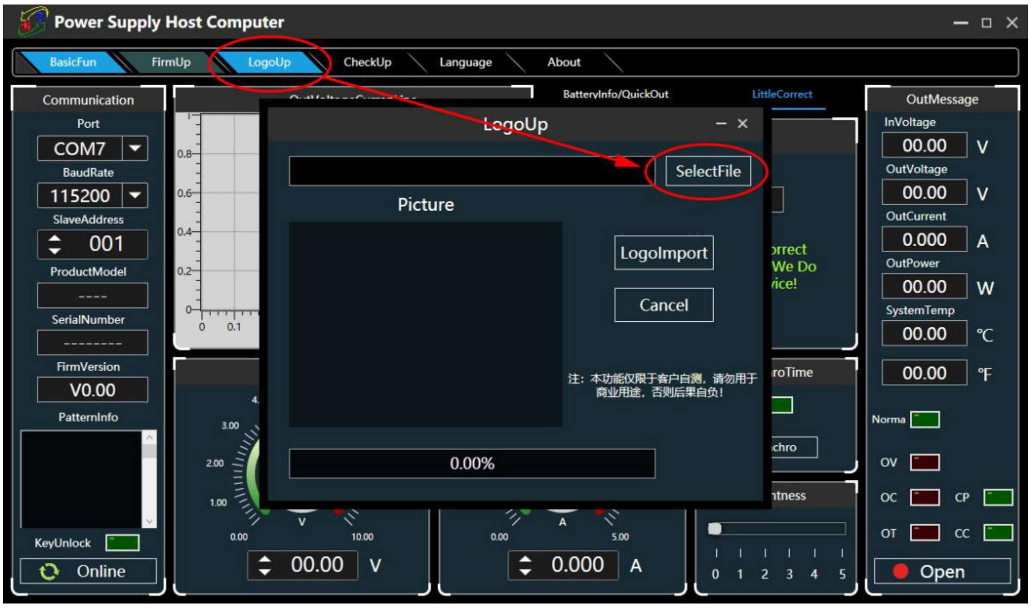
Set the output voltage at 1V, adjust the output voltage zero point to make the multimeter display close to 1V, then set the output voltage at 30V, adjust the output voltage proportional value to make the multimeter display close to 30V. In the same way you can set 0.1A and 3A output current to calibrate the the zero point and proportional value of the output current.

Set the output voltage at 1V and calibrate the actual output voltage zero point to make the actual output voltage displayed on RD6006 close to the value on multimeter. You can set 30V and calibrate the proportional value of actual output voltage. In the same way you can set 0.1A and 3A to calibrate the zero point and proportional value of the actual output current.(This section does not provide technical support. If you do not understand, please check the related information).

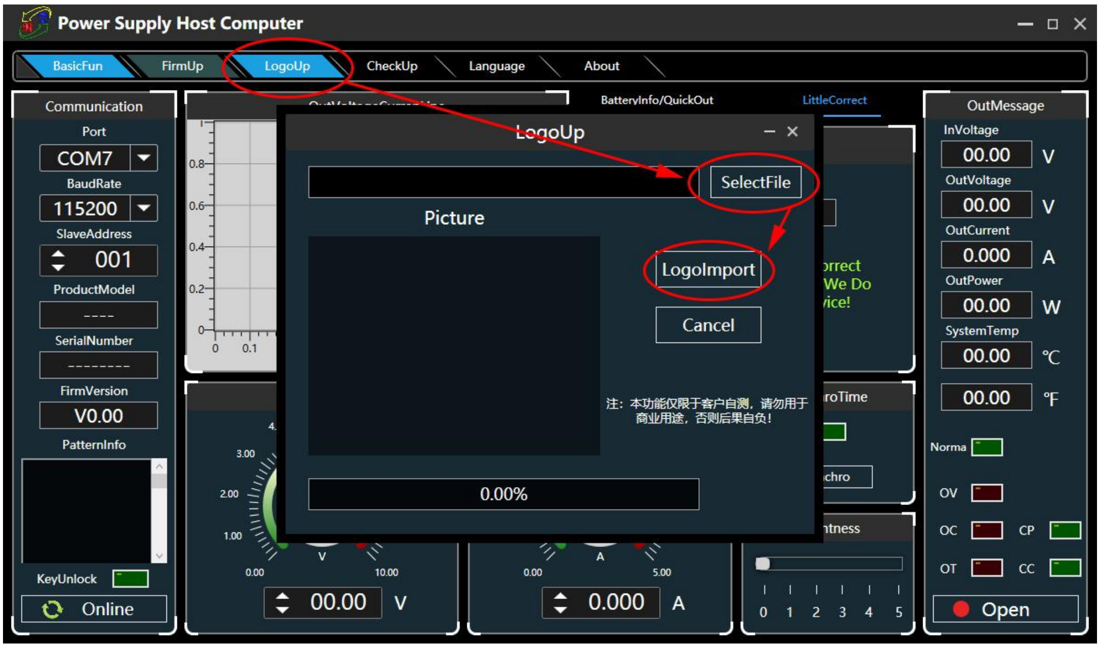
4.3.4 Logo Update

Boot logo setting video:https://youtu.be/vuVhBsohWts

Click **"Start Logo Update"**, a Logo upgrade prompt will pop up on the page, please select a picture with a size of 320x240 and a resolution of 96dpi (At present, only fixed-size image updates can be used at the moment, and we will add new function that you can use any size image and the image will be cropped and imported later. Some logo samples can be tested in the installation package)



Click "LogoImport" and RD6006 will reboot automatically.



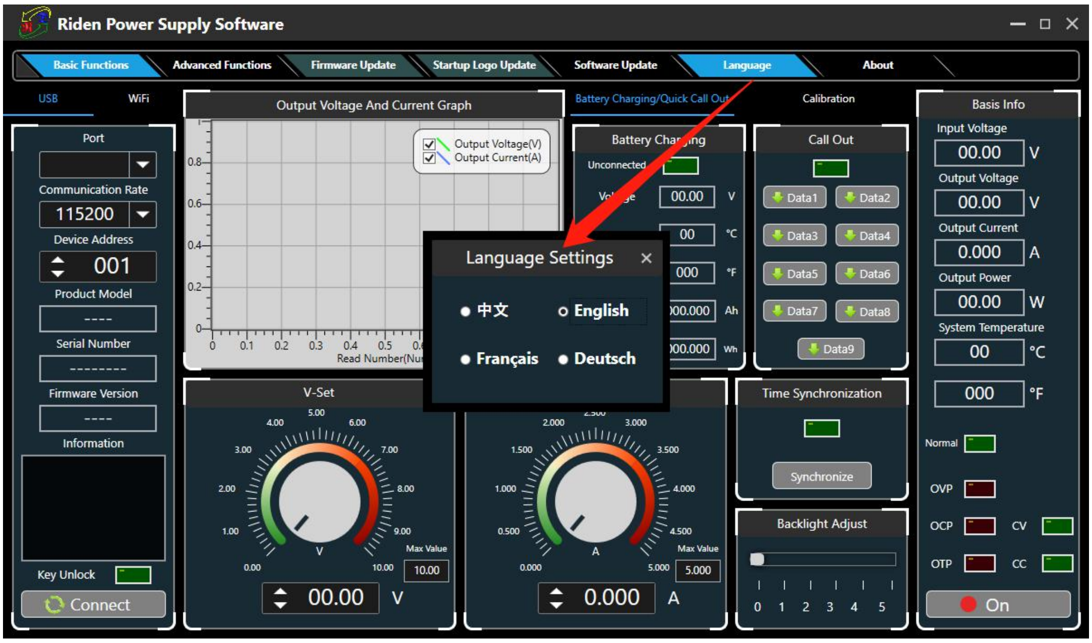
4.3.5 Version Update Detection

Click **“Software Update”,** the software will automatically detect if there is a new version, if so, a update prompt will pop up on the interface.



4.3.6 Language Setting

Click **“Language”**, a language setting prompt will pop up on the interface, you can choose Simplified Chinese, English, Frence and German.



4.3.7 About

Click **"About"**, you can check the version number, publish time and copyright Information.



Appendix 1: Common Battery Voltage Comparison Table

Battery Type	Nominal Voltage (V)	Max Voltage (V)	Min Voltage (V)	Application	Characteristics
LiCoMn NiO2	3.7	4.2	3	Digital Device	High capacity, rechargeable
Lithium Phosp hate Ba ttery	3.2	3.65	2.5	Electric bike / electric tool	Large discharge current, rechargeable
Lead Storage Battery	2	2.4	1.75	Car / electric bike	Inexpensive rechargeable
Dry Battery	1.5	--	0.9	Widely used	Inexpensive widely used not rechargeable
NICD Battery	1.25	1.5	1.1	Toy	Rechargeable Inexpensive Memory effect
Ni-MH Battery	1.2	1.4	0.9	Toy/Shaver	Rechargeable No memory effect

Appendix 2: Common Electric Vehicle Voltage Comparison Table

Nominal Voltage	Battery Type	Number of batteries connected in series	Discharge termination voltage(V)	Charging limit voltage(V)
72V	LiCoMnNiO2	20	60	87
	Lithium Phosphate Battery	24	60	87.6
	Lead Storage Battery	6	63	86.4
64V	Lithium Phosphate Battery	21	52.5	76.6
60V	LiCoMnNiO2	17	51	71.4
	Lithium Phosphate Battery	20	50	73
	Lead Storage Battery	5	52.5	72
48V	LiCoMnNiO2	14	42	58.8
	Lithium Phosphate Battery	16	40	58.4
	Lead Storage Battery	4	42	57.6
36V	LiCoMnNiO2	10	30	37
	Lithium Phosphate Battery	12	30	43.8
	Lead Storage Battery	3	31.5	43.2
24V	LiCoMnNiO2	7	21	29.4
	Lithium Phosphate Battery	8	20	29.2
	Lead Storage Battery	2	21	28.8